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THOUGHTS ON TEACHING THE SENIOR RESEARCH SEMINAR IN A FOUR-YEAR COLLEGE: SUGGESTED PROTOCOLS

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ABSTRACT

This is an experiential and philosophical account of teaching the senior research seminar to economics and finance students. This article covers issues involving grading, resources, project selection, accountability, assessment, and class structure as well as the culture shock felt by both students and teacher in an independent study environment. One major point is that greater communication and minimal structure are more effective in creating the atmosphere of a true seminar. Instead of wasting time on research methods and over-assessment, the active exchange of ideas and learning-by-doing should be the focus of the senior seminar.

I. INTRODUCTION

Senior seminars with a research focus have become a common feature of undergraduate degree programs in economics, increasing dramatically since 1990.¹ Alternatively, some programs have optional independent studies or honor classes, while others may require formal senior theses. Whatever the format, the research-focused class is usually described as a capstone, suggesting it is a kind of culmination of the educational experience. In our institution both economics and finance are housed within a single department that is located within an AACSB-accredited School of Business and Economics. Although the finance major (but not economics) falls under AACSB review, our program does not require the same business management capstone class that other business majors do; instead, finance students are required to take a research seminar in finance, which we cross-list with the economics seminar. We therefore have the unique situation of requiring the same senior-seminar research class for both the economics and finance majors.²

This paper is not a study or a survey of methodologies for teaching senior seminars. Instead, it is partly an experientially-based account that will discuss the necessary

¹ McGoldrick (2008, 292) surveyed 254 institutions and found that 60 percent had some kind of capstone/senior experience, whereas Siegfried, Bartlett, Hansen, Kelly, McClosky, and Tietenberg (1991, 203) determined that in 1990 the percentage was only 7 percent.

² It is not a major point of the paper that the class is technically interdisciplinary (from a bureaucratic perspective) since finance is often viewed as a field within economics. The larger concern is that combining sections can cause the class to become too large, with certain ramifications discussed below.

administrative aspects, and partly a philosophical treatment of various pedagogical issues. I will roughly follow the same timeline as the class itself, with an attempt to present some student perspectives as well. Along the way I will suggest that a minimalist approach to structure is both more realistic and more effective, and also that this is an unusual class requiring a much different perspective on the part of both students and faculty, constituting what will be referred to as a type of culture shock.

II. OVERVIEW: THE RESEARCH CONTINUUM

Students often enter the senior research course thinking they will be asked to complete some kind of a thesis, but many believe that this thesis will essentially resemble a kind of glorified term paper. They apparently have had a fair amount of experience in such projects because in a sample of 112 institutions McGoldrick (2008, 291) found that economics majors produced an average of 4.15 term papers over their college careers (median = 3.0). In completing what they think is just another term paper students will usually try to determine what the magic requirement might be in terms of page length. At that point I ask them to imagine a kind of continuum pertaining to research that is defined not by quantity, but by quality:



It should be defined not by page length, but by originality, in which 10 pages may constitute a greater achievement than 50 pages. Based on this 'continuum of creativity' as I will call it, a single idea, or sometimes just the number of obstacles overcome, may ultimately be just as important as length of submission.

In the goal of nurturing such an environment and moving students to (what I will arbitrarily designate as) the right of the continuum, your greatest asset here will actually be the students themselves. To this point, most of their course work has accustomed them to submitting reports closer to the descriptive (*e.g.*, biographical, historical), left-hand side of the spectrum. Yet many students are attracted to the prospect of leaving behind the commonality of lectures and tests to venture into what is for them the uncharted waters of real discovery. Some departments may also exert ownership over their capstone class and attempt to push students to one end or the other in the continuum of research topics. The Council for Undergraduate Research has even gone so far as to define undergraduate research as "...An inquiry that makes an original intellectual contribution to the discipline."³ But is that a realistic goal for the undergraduate student? Many departments apparently don't think so because according to McGoldrick's (2008, 294) survey of 139 economics departments, only 36% listed "...Ability to make an original contribution..." as a goal of the senior seminar.

³ Discussed in, and quoted from, DeLoach, Perry-Sizemore, and M.O. Borg (2010, 4).

At the very least one should expect there to be some evidence of the use of traditional scientific methods. In empirical studies that usually entails a blueprint consisting of:

- Introduction
- Background and theory
- Model and use of statistical techniques
- Data and discussion of variables
- Hypotheses and expected signs of coefficients
- Estimation of the model
- Analysis of results
- Conclusions and suggestions for further research

But whatever the obvious merits of that paradigm, I believe that in this particular academic environment it may be fruitful to occasionally unchain ourselves from such a constraint. Thomas Edison attempted literally thousands of experiments, in many cases guided by no particular theory, before he discovered the combination of materials that would become the light bulb.⁴ I believe that in this type of class, and in this kind of laboratory setting, there must also be room for Edison-type exploratory research.

The purpose of raising this point is to suggest that the instructor of the senior seminar should allow some flexibility in choice of both topic and outcomes. There must also be an allowance for some degree of self-discovery, as well as an acceptance of the fact that creativity can often be hampered by the enforcement of overly-rigorous methodological blueprints. I believe that in the pursuit of discovery, result and tradition are, or should be, subservient to creativity, effort, and the scientific method. This same sentiment is echoed in these instructions given to senior students at Harvard University:⁵

Sometimes — too often — students have the impression that all Economics senior theses are expected to follow a cookie-cutter approach in which the procedure is to state a question, suggest some regression that brings empirical data to bear on that question, run the regression, report the results, and draw the indicated conclusion. In truth, many Economics theses do follow this pattern, or something very like it. But it is wrong - to repeat, it's wrong — to think that this is what a thesis in Economics has to look like.

It is tempting to speculate whether Thomas Edison, for his work prior to 1876, might have failed a senior seminar in physics if he were required to follow restrictive blueprints. When Archimedes determined the volume of gold in King Hiero's crown he declared "Eureka!" In general, for most students, what we are looking for in the senior seminar is

⁴ See Bryan (1926). In other words, hypotheses may follow experimentation. In the practice of statistical analysis, there are occasions in which the researcher has a sample data set in hand, yet is not entirely sure of the population that it is drawn from, or related to. The textbook procedure is the reverse: a sample is drawn only after the definition of the population is previously established. Yet that procedure essentially rules out exploratory research.

⁵ Friedman (2013, 2). In support of Friedman, note also that there is a school of thought that says that advances in science are characterized more as an anarchic process than an organized application of the so-called scientific method. See Feyerabend (2010).

not the production of a set of mini-dissertations, but instead a kind of Eureka experience that introduces the student to the thrill and the reward of discovery. To some extent all discovery is relative to an individual's prior knowledge, and so the instructor's main goal is to lead the student in applying and synthesizing concepts previously learned. But there is a difference between discovery and self-discovery. To assert or to prove something that the rest of the world has not known before is to discover. To find something that only an individual him/herself has not known before is to self-discover. A graduate dissertation presumably falls under the category of discovery, but this is unlikely to be a product of the senior seminar, given the limited base of knowledge of the participants.

III. OVERVIEW: CLASS STRUCTURE

First of all, what is a seminar? One definition partly consists of the following:

- (1) A small group of advanced students in a college or graduate school engaged in original research or intensive study under the guidance of a professor who meets regularly with them to discuss their reports and findings;
- (2) A meeting for an exchange of ideas; a conference.⁶

In attempting to create a seminar according to this definition, there are several items that impact the structure of the class. I have already highlighted the importance of originality as an overriding objective. Beyond that, to be effective I believe that this class must be relatively small or moderate in size. This should seem obvious because how else could there be the meaningful exchange of ideas required for a seminar? We all know that beyond a certain threshold the interactive dynamic diminishes. On the other hand, while it may be preferable to have a small group, it can also be disadvantageous if the group is too small. For there to be an exchange of ideas there must, after all, be a sufficient number of ideas to exchange.

To achieve the optimum learning experience, the importance of establishing moderate class sizes can not be overstated: both under- and over-enrollment are counterproductive. However, it is perhaps better to err on the side of under-enrollment because (1) smaller size allows for greater interaction with the instructor, (2) larger size requires too many class periods for presentations, and (3) you want to have sufficient time for questioning and comments during those presentations. What do you do if registrations cause you to surpass the ideal class size? At our institution initial registration has often approached 50 students, which in my experience far exceeds the optimum level. I have addressed this problem by first of all scheduling the class to meet twice rather than three times per week; and second, by sectioning the class so that half meets one day and the other half meets on the second day. Of course this can be somewhat problematic if an administrator chooses to enforce the typical contact-hour requirement of 2.5 hours per week, per student for a 3-credit class.⁷

⁶ The complete definition, taken from www.thefreedictionary.com also includes "(3) A course of study so pursued and (4) A scheduled meeting of such a group."

⁷ On the other hand, one can argue that a senior seminar research class is also more in the nature of an independent study. I have sponsored many independent studies in which contact with the student was less

Another strategy is to allow students to work in larger groups. This effectively reduces class size by reducing the number of different projects, thereby in some sense increasing teacher-student interaction.⁸ But two questions arise here: (1) is there an ideal size of group? (2) should students be required to form groups? For this class my suggestion is that a group usually should not consist of more than two, and that working alone should be a student option.⁹ I have allowed groups of three, but only in cases where the topic was particularly amenable to that number.¹⁰ Students that choose to work alone usually do so because they think it will simply be more efficient. From past experience I have not seen evidence that either arrangement is ultimately more productive. Some departments or some teachers may want to use this course as an opportunity to teach teamwork; I have never done that, nor has the department asked me to.

How else might we facilitate an exchange of ideas? First, I believe that a computer lab is the ideal venue because it creates a more informal environment in which teacher and students can interact and address issues in real time. It is also helpful in that it allows fellow students to directly assist other students. Second, I have every group give two class presentations so that everyone is informed of other students' research. Third, students are required to submit summaries of each presentation they attend, and are encouraged to ask questions or make comments during those presentations. Finally, other faculty members are invited to attend, and they often share important insights. Altogether then, the spirit of a true seminar is achieved through moderate class size, by selection of a variety of topics, and through extensive student-student and faculty-student interaction.

IV. LEARNING OBJECTIVES

The modest amount of structure I impose on the class is found in the learning objectives. The ones I list on the syllabus consist of most of the skills and activities necessary to successfully complete both the research and the research paper:

- (1) gathering, recording, and organizing data and other information such as the background literature;
- (2) use of descriptive statistics and statistical analysis;
- (3) graphical displays for both presentation and paper;
- (4) writing an academic research report;
- (5) presentation skill;
- (6) overall understanding of a particular topic in economics or finance.

than 10 hours for an entire semester, whereas a 2.5 hour-per-week class would entail a semester total of about 37.5 hours per student.

⁸ This may be true on a per-project basis, but not necessarily from the individual student's perspective. As groups get larger, some students may lose the opportunity for individual communication with the instructor to the extent that a group is dominated by only one or two spokespersons.

⁹ For an introduction to the voluminous literature on group work, and in particular the effects of size on performance, see Aube, Rousseau, and Tremblay (2011). I find students proficient in the social skills necessary to work in groups. For that reason I spend little time worrying about group composition.

¹⁰ For example, in finance a common analytical technique is the event study. In a 3-person group, students could use this to each investigate their own company or industry, with the common thread being the methodology itself.

It is assumed that students can ordinarily accomplish each of these objectives by applying normal effort.¹¹ Although it is a good idea to at least make available review materials pertaining to statistical analysis, and some general instructions for constructing a standard academic paper, it is assumed that students are capable of learning-by-doing for several of these objectives, most likely (1), (4), and of course (6). Also, I find that there is a wide variety of experience or ability in (3) and so it is important to show students good examples of what effective graphical displays look like (as opposed to the default versions produced by most software).

It should be noted that for the last objective it is not the teacher's responsibility to instruct students to any great extent, unlike the normal class; in most, but not all cases, students will select topics in which they have some familiarity. On the other hand, in the spirit of originality they may find a topic that neither you nor they have had much experience in. In either case, the instructor should point the student to the best, most accessible scholarship by finding suggestions for appropriate background articles. In fact this is one of the best uses of the instructor's time both in and out of class because most students are not adept at determining the most fruitful kinds of articles to contend with, and so can waste a lot of time in doing so. They can also quickly become discouraged in trying to read and understand articles that are more appropriate at the graduate level.¹²

V. RESOURCES

Historically, most colleges did not have access to the type of resources available to universities offering graduate degrees. Fortunately, the internet has expanded both the breadth and depth of undergraduate research opportunities, which may partly account for the large increase in seminar classes cited earlier. For economics students there is a great deal of U.S. macro data now available from free government sources, and presumably much more available on a fee basis.¹³ There is also a great deal of international macro data available through the World Bank and other organizations, and foreign students can often access data from their home countries as well. Projects in microeconomics can utilize data for particular markets such as real estate and housing, precious metals, petroleum, energy and electricity, education, and industrial commodities, as well as labor data that is widely available by industry and region.

Research topics in finance face their own special data restrictions. One major source, CRSP®/Compustat, carries a price tag that many four-year colleges choose not to fund, particularly given the economic challenges faced by many institutions since 2008. If Compustat is not available, finance students are usually prevented from using firm-level data, unless they are willing to take the considerable time to download annual

¹¹ I am forced to generalize here (and in the class) and initially assume upon entering the class that a student's prior learning experience was that of the average student exerting average effort. A survey distributed on the first day of class helps you determine whether the class is likely to be above or below that level.

¹² From the pedagogical standpoint this is one of the more challenging aspects of the class. Undergraduates will find that perhaps half of the academic articles in economics are so replete with higher math as to be completely inaccessible to their understanding.

¹³ I assume this to be true; students have almost always found sufficient data from free private and government sources.

reports. The lack of CRSP may not be quite as problematic because individual stock prices, stock indices, or even mutual fund values are not that hard to access. In our department finance professors have shared their own specialized data sets. In addition, finance students are often willing to study topics in monetary economics, public finance, and international finance for which data are easily found.

Although senior research could conceivably involve areas that are less quantitative and more qualitative, such as topics in the history of economic thought or economic history, students almost always choose topics that require quite a bit of numerical analysis and computer work. The students who are the most comfortable in this class are therefore the ones who retained an understanding of hypothesis testing, regression and correlation from previous coursework. At our institution we require economics and finance majors to take two basic courses in statistics, plus econometrics. For computer software, it is hard to imagine that an accredited institution would not have a site license for SAS®, SPSS®, or a similar type of advanced statistical package. If not, there are free downloads such as gretl that are more than adequate for many, if not most, econometric applications. Many students manage to get by with just Excel®.

In terms of resources the undergraduate would seemingly then have most of the tools necessary for independent research: accessibility of data, training in statistics or research methods, and statistical software. It is also safe to assume that almost all college libraries would possess the necessary utilities such as EBSCOhost® that would allow access to major academic journals. What remains then is for the instructor to provide overall guidance and direction (and a good amount of encouragement), as students attempt to compose and present what for many of them will be their first academic-level research paper.

VI. CULTURE SHOCK?

The research seminar differs significantly from the normal undergraduate class, and may therefore constitute something of a culture shock for both the teacher and the student. From either perspective this class is indeed a strange animal: few if any lectures, no textbook, the opportunity to access computers for entire class periods and (in our case) a requirement of only half attendance. In the context of such a seemingly unfettered atmosphere, students should be advised very early that their greatest challenge may simply consist of finding the self-discipline and initiative to complete their projects on time. In any case, to ease the first shock and to acclimate students to this new environment, it is useful to begin by surveying them to learn of their academic backgrounds. Applying the value-added concept of education, it is important to understand what students are bringing to the class before estimating what can reasonably be expected. With the basic prerequisite of senior standing, most students have at least read a few journal articles, have received extensive training in statistics, have delivered a presentation or two, and have used library technology. But a second shock, if you will, occurs with the realization that there is considerable space between having to learn things in order to pass tests, and having to apply that knowledge to real problems. For many it will be their first experience in empirical investigation, with most students having never

handled their own (sometimes very large) data sets, formulated their own hypotheses, or made the connection between theory and practice.

Another source of cultural shock, this time to the instructor, has to do with understanding what students do not bring to the class. Students typically do not have the luxury of living in the one-dimensional world of most professors. A professor may have devoted 40 years to studying just this, their chosen subject of economics or finance, whereas student interest is likely to have been a relatively recent acquisition. Few have the luxury of divorcing themselves from the many other influences affecting their mental space, i.e. chemistry, English, philosophy, *etc.* Other distractions include the typical senior pressures having to do with job search and relocation. Therefore, the senior seminar teacher who thinks he or she is overseeing the next wave of academic dissertations is headed for their own kind of eureka moment.

A fourth cultural shock for students, and to some extent faculty, has to do with expectations concerning quantitative proficiency apart from computer usage. You may find that even seniors do not have a good working knowledge of the normal distribution, hypothesis tests, or p-values — either because of the elapse of time, or because of poor performance in previous classes.¹⁴ On the other hand, other students may have just completed their advanced stat class in econometrics. In our department we schedule econometrics for the fall semester, and the senior seminar for the spring, but students who graduate in the fall will not yet have had their econometrics class. In the face of all this, one may be tempted to remediate by way of lecture, review, and testing. From prior experience I have found that is not a good idea. Instead, it is best to move the class as rapidly as possible toward the first major goal: finding a suitable topic. Problems with statistical analysis typically come later in the semester anyway, so it is best to temporarily downplay the statistics. You can perhaps provide a summary sheet in the beginning of the semester highlighting important procedures and practices.

The next type of culture shock has to do with how students go about conducting academic research, and even with their basic conceptions of knowledge. They are generally not aware that their chosen topic perhaps has a very long intellectual history, and usually do not have any idea where that body of knowledge resides. It is no great revelation, but still bears repeating, that today's student has been shaped by a technological culture supplying them with instant access to quick summaries and fast facts. Their concept of exploring background literature would consist of Google and Wikipedia if they weren't instructed otherwise. This Google pandemic, if you will, becomes a major concern to the instructor, who again must make a concerted effort to guide students away from the term paper mentality.

Finally, it may come as a surprise to the student that you, the professor, may not be very familiar with their area of research; in fact they will initially assume that you are the expert. Therefore, to the extent that they choose their own topics, you may have to scan quite a variety of unfamiliar literature to be able to give them assistance.

¹⁴ In fact, I have found that many students do not even remember how to obtain a percent change! All of this may be both a testament to the existence of low standards for mathematical achievement, and an argument for making the research seminar an optional class only for honors — level students.

Encountering such new ideas can make the class quite interesting, but one also has to decide where to draw the line on collaboration. There is a certain amount of learning-by-doing (self-discovery) that must be allowed for. Alternatively, some schools require other faculty to provide assistance and help guide individual projects; although our department has not specifically encouraged or discouraged that process, some faculty have voluntarily assisted students when asked.

VII. COURSE ADMINISTRATION

It can be a challenge to give chronological structure to a class that does not have traditional lectures, tests, or homework assignments. From both a pedagogical and a student viewpoint, class structure can easily become a kind of missing link to the senior seminar. Most students are accustomed to, and many actually prefer, a series of deadlines and assignments. It is therefore easy for them to become somewhat disoriented (but not disappointed) by the absence of lectures, tests, etc. In that kind of environment the natural tendency will be to underestimate the amount of time necessary to complete their projects. The instructor's challenge is how to structure this type of class without stifling creativity, so that they can move forward and start accomplishing their objectives.

However, it is my acquired belief, and one of the main points of this paper, that blueprints, deadlines, and excessive organization can easily derail this class. To ask students to produce formal plans and follow schedules for submitting introductions, collecting data, writing first and second drafts, etc. is likely to be counterproductive. I suspect that many teachers impose such constraints because they believe that the more assessment the better, either because they want to be able to quantify grades as soon as possible, or because they think that students would otherwise not be motivated to perform. But time is a luxury. Even the good student who finds a relatively clean topic can take up to three weeks for each of the following: topic selection, synthesis of previous literature, collection and organization of data, analysis and computational issues, preparation for presentations, and compilation of the final paper. And you still need another few class periods for introductory instructions and the presentations themselves.

According to McGoldrick (2008, 295), fully 80 percent of her 75 sampled institutions attempted to teach the research process using specific exercises or examples. These included how-to instructions in:

...Identifying economic issues, developing a research question, undertaking a literature review, summarizing relevant literature, identifying an area of potential contribution, locating and analyzing data, drawing conclusions, comparing conclusions to literature, applying analysis to current policy issues, presenting research to peers, and presenting research to faculty.

In my opinion, such an overemphasis on research design and methodology occupies far too much time and detracts from the basic focus of the seminar, which was defined earlier as "a meeting for an exchange of ideas." We are dealing here with undergraduates who do not, and most likely never will, live in the exacting publish-or-perish environment of academia. Many programs recognize that it is impractical to try and do too much in the

senior seminar, and have devised separate courses in research methods and design that may be 1, 2, or even 3 credits. Often these are prerequisites for honor courses, senior theses, or independent studies.

In general, for the assessment aspect of the senior seminar I assume that it is better to focus on personal communication and instruction/exploration of topics than on micromanagement and grading of papers. Is it more useful to spend time helping students in the creative aspect of their research, or on assessment of various preliminary assignments having to do with research methodology and design? My response is dictated to some extent by the fact that in our department the senior seminar is not a part of what we locally call writing-across-the-curriculum. This is a campus policy that every major have a writing-intensive class that entails multiple written assignments, detailed teacher feedback, rewriting and resubmission. But I believe that it is a mistake for this course to try and serve the dual purpose of being both a research seminar and an advanced writing class since it would only serve to distract students from their main objective, which is research and discovery.

VIII. ORGANIZATIONAL TIMELINE

From the teacher's viewpoint the first administrative requirement is to deliver the syllabus, and as mentioned above I also gather information through a survey at that time. Along with the learning objectives, the syllabus contains 20 to 30 general suggestions for topics, where to find macro, micro, and financial data, and how to construct an academic paper. It also informs students that there will be five tangible things required of them in addition to the overall research effort: attendance, a semester journal, two presentations, and the final paper submission.

1. Selection of Topic

From the student's viewpoint their first responsibility immediately faces them with a formidable challenge: the selection of a suitable topic. One can easily argue that they are being asked to do the impossible. After all, most students have not been exposed to the literature enough to have learned what the issues or controversies are in almost any academic area. Therefore, in this aspect of the course the weight falls somewhat on the teacher, and so I have found that the process can be expedited considerably if you provide a list of 20-30 potential topics. Eventually I speak to everyone and get a sense of their interests, make suggestions, and record a tentative choice. If students propose to investigate an area that you are not familiar with it may be necessary to scan the literature for them in order to determine how feasible their project may be. Students should be made aware that their topics may be too easy or too difficult. Easy topics can be allowed, but the student should be informed that the lack of difficulty may also warrant a lower grade. Projects that are overly ambitious face different problems: students may run out of time, encounter theoretical difficulties, or simply become discouraged. Often there are a few who possess a more forward-looking perspective. They will treat the senior project as a steppingstone to a career-entry position. A student who knows they are entering real estate can find a topic having to do with housing; a student heading for graduate school in economics can try to develop skill in macro modeling.

It will usually take students close to three weeks just to settle on a topic, and often it takes longer. This is a stop-and-start process in which they may decide on a tentative topic, search the literature and potential data sources, and then two weeks later decide the project is not feasible. But every individual is required to find at least five background sources (whether or not they are in a group) related to their final topic. Students will try to cut corners here, but they must be made aware that their sources must be of the same caliber as books and journals, not run-of-the-mill websites. The process of determining a topic can be a formidable challenge, but students should be pressured early to settle on a topic and then to provide at least a verbal summary of their plans. Although three weeks is approximately a suitable target date, I do not believe that the meeting of this objective on time is a gradable accomplishment in and of itself. This again is a reason why I think it is better to maintain flexibility rather than impose excessive structure. It may be true that for the average student making an average effort, three weeks to find a project (leaving 12 weeks to finish) should allow sufficient time to complete a project of average difficulty. But in reality you will find that many projects evolve and take on different forms throughout the semester. Therefore, to require clear, well-organized plans is often pointless and counterproductive. Many successful projects may not coalesce until late in the semester because students will have data or other problems or because we have misjudged the difficulty of the original proposal.

2. Midterm Grading and Semester Journals

After about six or seven weeks, you can usually gather a sense of where everyone in the class stands, and how far they have progressed on their projects. For the midterm grade I use attendance, the semester journal up to that point, the first presentation, my own record of communications, and to some extent their choice of topic. Attendance is helpful in determining effort and in keeping communication lines open. If a large class is subdivided in half, students have to be in attendance on 15 days for an hour and a quarter each time, certainly not an onerous burden. But even in a small class you may find that it is not always possible to speak to every student or student group every week. For that and other reasons, it is useful for each student to maintain an individual weekly record.

The semester journal is a kind of portfolio that is meant to accurately reflect weekly, or even daily, individual effort and progress. It is an academic diary of successes, failures, thought processes and decisions, and will also show what they learned from the other students' presentations. For the student who worked hard all semester but seemed to accomplish comparatively little, it can bolster their case for a stronger grade; it can also help you determine whether one member of a group did substantially more work than another.

From an instructor's point of view it is helpful to maintain your own journal, with separate sections for each individual or group. In this way you perform a kind of double-entry bookkeeping that gives you a record of all suggestions, observations, and communications with each group. It tends to keep students a little more honest when they see that you are actively maintaining your own logbook of notes pertaining to each project. You will also not have to retrace your steps quite as much; in a class having 20-30 ongoing projects one can easily become overwhelmed. Without doing this you will find that some

students will try to take the easy way out, or will waste a lot of time venturing in directions that they were told would be unprofitable. They may also later claim that a project was too difficult to finish but that they had your permission to proceed. At the end of the semester your log will provide a much clearer basis for assessment as you try to trace their record of accomplishment, and you will also notice a stark contrast between the portfolios of the better and the weaker students.

3. First Presentation

The third item contributing to a midterm evaluation is the student's first presentation. Some projects may still be in the exploratory stage and this requirement may seem somewhat premature. But it is useful because it gives students a tangible target date that pushes them to make significant progress lest they fall behind. It also allows them to gauge their relative standing as they view other presentations. I ask students to begin by explaining why the subject matter interested them or why it matters to the world of finance and economics; they can provide a rough outline of their proposed method of study, and then give a brief summary of any prior studies. I advise them to outline only their two best sources, without going into too much detail. In papers with econometrics, they can show graphs of their dependent variable, speculate on determining factors, and propose a set of independent variables and hypotheses.

For the instructor, the mid-term presentation is an opportunity to provide a lot of advice and direction in a relatively short period of time. Students will hear criticism of other papers, some of which will be similar to theirs, and they will get a much firmer idea of what is expected. The instructor should be more openly critical of the first, informal presentation from a stylistic perspective than of the second presentation. PowerPoint slides, variable and hypotheses descriptions, graphical displays, verbal skills — everything is open for critique. At this point, style of presentation and quality of display are not so much graded, as they are taught. Most students are eager and accepting of criticism at this point, and you usually find that your suggested improvements are incorporated into their second, end-of-semester presentations. For grading purposes the content is the greater issue because both effort and progress will become more apparent. To encourage participation everyone is also required to summarize and evaluate each of the other presentations, recording their comments in their individual semester journals. Students then submit their journals so that you have an additional item on which to base the mid-term assessment.¹⁵

4. Second Presentation and Paper Submission

After midterms, students then have several weeks to continue and successfully complete their research. Their next milestones are the second presentation and then submission of the paper itself. For the presentation, an invitation is sent to faculty. Our department views this class as contributing to the overall assessment of our program, and

¹⁵ Some instructors may choose to require a first draft of the written paper. My bias is against that because in my own research I have never begun writing until most of the empirical work was finished. I also think that it is a good idea to let the students know that their mid-term grades may be lower than what they expected, simply because you can not yet make any assumptions on the quality of their final paper.

so faculty attendance has usually been quite good. The second presentation should be more formal and professional than the first one, and the presence of other faculty contributes significantly to the quality of the seminar. One mistake to avoid here concerns timing. It may be tempting to allocate all of the final exam week to the second set of presentations, but since the final paper submission is 30% of their grade, I believe that a better strategy is to schedule this presentation for the week preceding final exam week. That gives a student sufficient time to make modifications suggested by faculty and to further perfect their work; the good students will make the effort, the weak students will not.

IX. GRADING

The senior seminar presents a unique challenge in so far as there are no objective tests or homework, and the bulk of the student's responsibility is essentially a single paper submitted at the end of the term. By comparison, the other structural requirements of attendance, a semester journal, and the two presentations are relatively straightforward. A competitive element is also introduced because students are made aware that to some extent they are graded on relative merit. This may seem like an invitation to coercion whereby students collectively conspire to create a low common denominator, but in my experience that doesn't happen. In every semester there seems to be at least three leading groups that set a high bar, deserving an A grade according to any reasonable measure. My rough standard for this and other senior classes is that grades of a B+ and above are reserved for the ones I believe are likely to succeed at the graduate level. Other groups are then placed into lower and lower tiers in relation to the first group.

The basic grade composition that I use consists of 60% for the research paper, 15% for the semester journal, 15% for the presentations, and 10% for attendance. I tend to grade presentations and journals easier than the research project itself so that normal efforts on those two items are often given a full grade. The student who makes a reasonably effective presentation, exerts a normal amount of effort in compiling their journal, and attends class regularly, can easily attain a high mark for about 35-40% of their total grade. With even just a modest effort on the research/paper they could earn about half of the remaining 60% and thereby achieve a final level of 65-70%, for an overall grade of almost a C-. But since most students are not happy with that low of a grade for what is supposed to be their capstone class, they realize that there is pressure on them to put forth more than just a modest effort in their work. From my experience this system has worked well in that the final grade distribution never seems to be out of the ordinary compared to other classes. You typically get about 15% each in the A and C ranges, the lion's share in the B range, and very few grades of D or E.

Obviously, the greatest difficulty and the greatest care must be given to grading the student's overall research effort and paper submission, neither of which is easily quantified. For the paper and research/effort component I allocate about half of the grade (i.e. half of the 60%) towards the project effort. You always have to allow for the possibility of there being a strong effort and a lot of creativity and self-discovery, but relatively meager results or actual discovery. For the other half of the 60%, the actual paper submission, the student has to be careful that they followed your instructions for writing

academic papers,¹⁶ listed previously as the 4th learning objective. This means there should be an introduction, summaries of at least five academic sources per person, explanation of variables and hypotheses, a detailed analysis of results, accurate listing of data sources, a conclusion containing recommendations for further research, standard formatting of references, and an appendix if necessary.

Given the lack of standardized testing, grading this type of class can be very difficult. There is obviously a lot of subjective evaluation involved because student outcomes can't easily be categorized or compared. All projects will have encountered obstacles, but these can vary from theoretical problems to computational issues to difficulty in finding data. The demonstration of perseverance and self-initiative in overcoming those obstacles I believe should be rewarded separately from objective results. This gets back to the idea that discovery and self-discovery are two separate things. You can sometimes discern levels of accomplishment by the extent students sought your help, and what kinds of questions they asked. The better students will have attempted to modify or improve their studies in response to the advice they received throughout the semester (which you should have a record of), including any comments they received from other faculty. A couple of well-placed questions during their presentations can tell you whether they understood their topics. In addition, I find it is also helpful to ask other faculty in attendance at the presentations to supply their own grade evaluations.

X. CONCLUSION

I have shared here the experience of one faculty member at one institution in teaching a senior research-based seminar. According to the survey of institutions by McGoldrick (2008, 290), from a programmatic standpoint my department could be considered somewhat unusual: Our students must each pass a final comprehensive exam before graduating, and everyone is required to take both econometrics and a separate writing course; in the class itself we mix both finance and economics students, making for a somewhat more diverse and rich learning experience. Our one disadvantage as a four-year college is that we do not have access to some of the advanced databases commonly found in graduate finance programs.

My method of teaching the senior seminar is unusual in that the continuous assessment and excessive structure favored by many other economics departments is downplayed.¹⁷ What I have tried to achieve is perhaps best captured by Reyes (2010, p. 112) who proposed that this class be one that: "[bridges] the gap between *passively* consuming economics and *actively* producing economics" (italics added). The atmosphere I have tried to create is one in which the student is free to invest their creative

¹⁶ The instructions for the format are tailored towards the empirical-econometric type of paper, since that typically applies to over 90% of the class. Instructions for other types, i.e. survey, historical, and theoretical papers are usually given personally on a case-by-case basis.

¹⁷ Whereas there appears to be a general bias on the part of many departments to arrange a much more structured environment. McGoldrick (2007, 5) cites a 2006 panel of five expert faculty who largely agreed with that notion.

energy, rather than worrying about never-ending mechanisms of assessment. Discovery and self-discovery are preeminent.

Students with normal interest and initiative are both attracted to, and motivated by, the prospect of a relatively unfettered learning environment. However, it would be a mistake to think that all students possess sufficient interest and ability as they enter this class. Some will exhibit no interest whatsoever in this type of active learning, preferring instead just another lecture and standardized-testing format. Because of this one can always expect at least some students to self-select themselves into the lower range of the normal distribution. Fortunately, in our institution we always seem to have a top-tier of exceptional student who makes this class rewarding for all parties involved.¹⁸

Finally, there is another type of culture shock that students may experience in the senior seminar. It is perhaps the nature of a soft science, but there are many areas of economics and finance in which the so-called unequivocal results we would all like to obtain may be rather hard to come by. Students should be made aware that they will most likely be dealing with concepts that are ambiguous, hard to measure, and even harder to prove. Their laboratory is the real world of events, but their test tube is likely to consist of abstract theories, or numbers on a computer screen. In a recent issue of *Scientific American* it was suggested, however, that articles submitted to academic journals should never be screened just on the basis of results.¹⁹ Instead, the author (an instructor in neurology at Harvard Medical School) asserted that the peer review process should be guided by the "importance and relevance of the reported study" and "whether the methodology (including that of the data analysis) is sound."

In the senior seminar undergraduates often become discouraged if they do not get the results some theory suggested they should. If they are unable to reject a null hypothesis they will usually assume that their entire study was a failure. The culture shock arrives with the realization of just how fragile the underpinnings are of what they thought was accepted knowledge. But that may also be the most important thing they learn in the senior seminar.

REFERENCES

Aube, C., V. Rousseau, S. Tremblay 2011. Team Size and Quality of Group Experience: The More the Merrier? *Group Dynamics: Theory, Research, and Practice* 15 (4): 357-375.

Bryan, G.S. 1926. *Edison, The Man and His Work*. London: Alfred A. Knopf.

¹⁸ For that reason, and for the long-run benefit of students, faculty, and the overall program, I suggest that this class be allowed to rotate from time to time among the faculty. And, as mentioned previously, it may be even more rewarding to the student who has a specific job prospect in mind and who tailors their research accordingly.

¹⁹ Joseph J. Locascio, Letters, *Scientific American*, December 2011, p. 9-10.

DeLoach, S.B., E. Perry-Sizemore, M.O. Borg 2011. Creating Quality Undergraduate Research Programs in Economics: How, When, Where (and why). Elon University, Department of Economics Working Paper Series, wp2011-02.

Feyerabend, P. 2010. *Against Method*, 4th ed. London: Verso Books.

Friedman, B. 2013. Why to Write a Senior Thesis in Economics. Department of Economics, Harvard University. Retrieved on June 10, 2013 from <<http://www.economics.harvard.edu/files/whythesis13.pdf>>.

McGoldrick, K. 2007. Undergraduate Research in Economics. The Handbook for Economics Lecturers, The Economics Network, Retrieved on June 10, 2013, from <<http://www.economicsnetwork.ac.uk/handbook/ugresearch>>.

McGoldrick, K. 2008. Writing Requirements and Economic Research Opportunities in the Undergraduate Curriculum: Results from a Survey of Departmental Practices. *Journal of Economic Education* 39 (3): 287-296.

Reyes, J.W. 2010. Teaching the Art of Economic Research in a Senior Seminar. *The American Economist* 55 (2): 111-123.

Siegfried, J.J., R. L. Bartlett, W.L. Hansen, A. C. Kelly, D. N. McClosky, T. H. Tietenberg 1991. The Status and Prospects of the Economics Major. *Journal of Economic Education* 22 (Summer): 197-224.